

WHAT IS CLAIMED IS:

1. A zirconium phosphate with an exfoliated structure, characterized in that it is provided in the form of a gel, the content of organic compounds of which is at most 1000 ppm, more particularly at most 500 ppm.
2. A zirconium phosphate with an exfoliated structure, characterized in that it is provided in the form of a gel devoid of organic compounds chemically bonded to the phosphate.
3. The phosphate as claimed in claim 2, characterized in that it exhibits a content of organic compound of at most 1000 ppm, more particularly of at most 500 ppm.
4. The phosphate as claimed in one of the preceding claims, characterized in that it is composed of particles exhibiting a form factor of between 100 and 5000.
5. The phosphate as claimed in one of the preceding claims, characterized in that the gel exhibits a pH of at most 4.
6. The phosphate as claimed in one of the preceding claims, characterized in that the gel exhibits a pH of at most 2.
7. The phosphate as claimed in one of the preceding claims, characterized in that it exhibits, by solid-state NMR analysis, shifts at -19 ppm and at least one other shift of between -20 ppm and -23 ppm.
8. A zirconium phosphate with an exfoliated struc-

ture, characterized in that it is provided in the form of a gel in an organic solvent and in that it has been obtained from a phosphate as claimed in one of the preceding claims.

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9. A zirconium phosphate with an exfoliated structure, characterized in that it comprises an intercalation compound between its constituent sheets of particles and in that it has been
- 10 obtained from a phosphate as claimed in one of the preceding claims.
10. The phosphate as claimed in one of the preceding claims, characterized in that it additionally
- 15 comprises an oxide chosen from silica, alumina or titanium oxide.
11. A sodium zirconium phosphate, characterized in that it exhibits a Na/P ratio of greater than 0.5,
- 20 more particularly of at least 0.7 and more particularly still at least equal to 0.8.
12. The phosphate as claimed in claim 11, characterized in that it can give, by acidification, a zirconium
- 25 phosphate with an exfoliated structure in the form of a gel, the content of organic compounds of which is at most 1000 ppm, more particularly at most 500 ppm.
- 30 13. The phosphate as claimed in claim 11, characterized in that it can give, by acidification, a zirconium phosphate with an exfoliated structure in the form of a gel, devoid of organic compounds chemically bonded to the phosphate.
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14. The phosphate as claimed in one of claims 11 to 13, characterized in that it is provided in the form of a dispersion with a pH of at least 7, preferably of at least 9.

15. A zirconium phosphate, characterized in that it exhibits, by solid-state NMR analysis, shifts at -19 ppm and at least one other shift of between -20 ppm and -23 ppm and an X-ray diffraction diagram with peaks at 10.66, 5.32 and 7.65.
16. A process for the preparation of the zirconium phosphate as claimed in one of claims 1 to 7, characterized in that it comprises the following stages:
- (a) an aqueous dispersion of a crystalline zirconium phosphate is formed;
  - (b) a sodium compound is added to said dispersion in an amount such that the Na/P ratio is greater than 0.5, more particularly at least 0.7 and more particularly still at least equal to 0.8;
  - (c) an acid is subsequently added, whereby either a gel or a solid compound is obtained, which solid compound is resuspended in water and gives a gel.
17. The process according to claim 16, characterized in that the crystalline zirconium phosphate is prepared by precipitating, in an acidic medium, a zirconium phosphate from phosphoric acid and from a zirconium compound, the zirconium being in the IV oxidation state, and by then optionally subjecting the product obtained to a heat treatment.
18. The process as claimed in either of claims 16 and 17, characterized in that use is made, in stage (c), of an acid chosen from hydrochloric acid, sulfuric acid, nitric acid and phosphoric acid.

19. The process as claimed in one of claims 16 to 18, characterized in that the acid is added in stage (c) until a pH of at most 3 is obtained.
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20. The process as claimed in one of claims 16 to 19, characterized in that the gel resulting from stage (c) is washed until a pH of at most 4 is obtained.
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21. A process for the preparation of a zirconium phosphate additionally comprising an oxide chosen from silica, alumina or titanium oxide, characterized in that the zirconium phosphate as claimed in one of claims 1 to 7 and a precursor of said oxide are brought into contact and then the oxide is precipitated.
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22. A process for the preparation of the zirconium phosphate as claimed in claim 8, characterized in that an aqueous gel of the zirconium phosphate as claimed in one of claims 1 to 7 is mixed with the organic solvent and then the mixture is heated to remove the water.
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23. A process for the preparation of the zirconium phosphate as claimed in claim 9, characterized in that an aqueous gel of the zirconium phosphate as claimed in one of claims 1 to 7 is mixed with the intercalation compound or with a precursor of the latter.
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24. A process for the preparation of the zirconium phosphate as claimed in claim 15, characterized in that it comprises the following stages:
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- (a) an aqueous dispersion of a crystalline zirconium phosphate is formed;

- (b) a sodium compound is added to said dispersion in an amount such that the Na/P ratio is greater than 0.5, more particularly at least 0.7 and more particularly still at least equal to 0.8;
  - (c) an acid is subsequently added, whereby the zirconium phosphate is obtained in the solid form in the reaction medium.
25. A process for the preparation of the sodium zirconium phosphate as claimed in one of claims 11 to 14, characterized in that it comprises the following stages:
- (a) an aqueous dispersion of a crystalline zirconium phosphate is formed;
  - (b) a sodium compound is added to said dispersion in an amount such that the Na/P ratio is greater than 0.5, more particularly at least 0.7 and more particularly still at least equal to 0.8.
26. A process for the preparation of a composition based on a macromolecular material, characterized in that use is made, during this preparation, of the zirconium phosphate as claimed in one of claims 1 to 10 or 15 or prepared by the process as claimed in one of claims 16 to 24.
27. The process as claimed in claim 26, characterized in that the macromolecular material is a latex.